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haemorrhage. The impact of external ventricular drainage (EVD) for acute hydrocephalus on AVM rebleeding has not been yet reported in the literature.

Methods Since 1995, clinical and angiographic data of cerebral AVMs were prospectively collected. In this study, we selected patients harbouring an AVM located in a lateral ventricle discovered by a bleeding. The implication of following factors on rebleeding was analyzed: age, sex, associated aneurysm, nidus size and type, venous ectasia, Spetzler-Martin grade, placement of EVD and side of the drainage.

Results Twenty-two patients (mean age 27.9 years) were consecutively treated. Locations of the AVM included the atrium in 13 cases (59.1%), the frontal horn in 12 cases (54.6%) and the occipital horn in 2 cases (9.1%). 9 AVMs (40.9%) interested eloquent areas. The Spetzler-Martin grade was II in 10 cases (45.5%), III in 3 (13.6%), IV in 8 (36.4%) and V in 1 case (4.5%). Associated aneurysms were classified as nidus (2 cases, 9.1%), flow-related (2 cases, 9.1%) and unrelated to the AVM (3 cases, 13.6%). Ten (45.5%) patients developed a secondary hydrocephalus. Five EVD were placed in the ventricle of the AVM and the five other in the contralateral ventricle. The placement of the shunt in the contralateral ventricle was a significant risk factor AVM rebleeding (95% CI: 4.33–10.42, $p < 0.005$). The presence of an associated aneurysm, diffuse type of the nidus and the placement of EVD seemed to be risk factors for the rebleeding of the AVM.

Conclusions The placement of EVD in the opposite side of the AVM significantly increased the risk of rebleeding of the AVM. We recommend the placement of EVD in the side of the AVM even if the obturation of the shunt could be problematic also as the avoidance of the nidus by the catheter.

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E-056

PIPELINE ENDOVASCULAR DEVICE FOR THE TREATMENT OF INTRACRANIAL ANEURYSM AT THE LEVEL OF THE CIRCLE OF WILLIS AND BEYOND: MULTICENTER EXPERIENCE

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Background and purpose The aim of our study was to evaluate the safety and efficacy of the Pipeline endovascular device for the treatment of anterior circulation aneurysms at the level of circle of Willis and beyond.

Methods A consecutive series of 23 patients with unruptured and 1 with ruptured anterior circulation aneurysms treated with Pipeline endovascular device. Complication rates, aneurysm obliteration, modified Rankin Scale (mRS) outcomes were assessed.

Results All devices were placed properly, without technical difficulties.

We found 1 minor clinical event (resolved within 7 days from procedure) and 1 major event (symptoms present after 7 days) (table), and no mortality.

There were no aneurysm rupture or parenchymal haemorrhage during follow-up.

The mRS at 3 and 6 months did not change from prior mRS in all cases but 1.

We had 2 asymptomatic periprocedural ischemic events: 1 perforator stroke in the case of a recanalised A1-A2 where we used 2 PEDs, and 1 lacunar stroke. Both cases were discovered incidentally at the control CT predischarge.

We had 3 intraprocedural complications, resolved without clinical consequences: 1 acute branch occlusion during hypotension state which was solved after TA raise (case 4), 1 slow opacification of the inferior trunk of MCA resolved with intraarterial bolus of reopro (case 20), and 1 focal SAH secondary to distal perforation with the microwire during and exchange manoeuvre which was resolved with coil occlusion and glue at the level of the perforation, with no symptoms (case 14)

Six-month follow-up angiograms were obtained in 16 aneurysms, showing complete occlusion in 9 and significantly decreased residual filling in 7.

5 cases are still pending on 6 months DSA and 1 case showed residual filling at the 3 months follow-up.

Patency of PEDs and status of branches originating from the aneurysm sacs were evaluated in 17 and 11 angiograms respectively.

All PEDs were patent, but we found 4 intrastent stenosis at 6 months DSA where only 1 symptomatic case (an angioplasty was done successfully).

In the 11 branches evaluated, 7 were patent, 2 moderate reduced and in 2 cases were occluded asymptotically.

Conclusion The PED provides a safe and effective solution for aneurysms at and beyond the circle of Willis. Preliminary results are promising but larger series with longer-term follow-up examinations are required to show the long-term safety and durability of this treatment alternative.

Disclosures M. Martínez-Galdámez: 2; C; Covidien. I. Linfante: 2; C; Covidien, Stryker, Codman. E. Lin: None. G. Dabus: 2; C; Covidien, Microvention, Reverse Medical.

E-057

CORRELATION BETWEEN ANGIOGRAPHIC TRANSIT TIMES AND NEUROLOGICAL STATUS IN PATIENTS WITH ANEURYSMAL SUBARACHNOID HAEMORRHAGE

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Introduction The use of digital subtraction angiography (DSA) for semi-quantitative cerebral blood flow (CBF) assessment is a new method. In this report we sought to correlate angiographic transit times (TT) in patients with aneurysmal subarachnoid haemorrhage (aSAH) in relation to Hunt & Hess (H&H) grade.

Methods A cohort of 28 patients with aSAH were included. Demographic variables, neurological status, and comorbidities were collected. We developed a method to measure CBF by colour-coding reconstruction from DSA contrast intensity. Regions of interest were chosen over major cerebral vessels (see legend Figure 1). The estimated TT included Time-To-Peak (TTP) from 0–100% intensity (TTP_{100%}), TTP from 25–100% (TTP_{25–100%}), and TT from 100–0% (TT_{100–0%}). Student t-test was used to compare TT between group 1 (H&H 1–2) and 2 (H&H 3–5).

Results There was no difference in demographic factors between groups 1 (n = 10) and 2 (n = 18). The majority of patients in group 2 (all except 3) had an external ventricular catheter with normal intracranial-pressure documented during DSA. There was a strong correlation in all TT between M₁, M₂, A₁ and A₂. There was a statistically significant difference in M₁-TTP_{100%},



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